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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BAGGOT, BRENDAN O	

ART UNIT	PAPER NUMBER
1638	

NOTIFICATION DATE	DELIVERY MODE
03/20/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No.	Applicant(s)	
	10/519,476	LEE ET AL.	
	Examiner	Art Unit	
	Brendan O. Baggot	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *9/20/07*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *1-16 and 19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Restriction / Election

1. Applicant's election of Group IV, claims 17-18, in the reply filed on 9/20/07 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

3. Claims 1-16 and 19 are nonelected.

4. Claims 17 -18 are pending and examined in the instant application.

Claim Rejections - 35 U.S.C. §112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17-18 provides for the use of a method for inducing plant growth inhibition, but since the claims do not set forth any steps involved in the method/process, it is unclear what

method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. Claim 18 is rejected because it does not set forth any steps involved in the method/process as well as by virtue of its dependency from 17.

Claims 17-18 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example Ex parte Dunki, 153 USPQ 678 (Bd.App. 1967) and Clinical Products, Ltd. v. Brenner, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). MPEP 2173.05(q).

In claim 18, it is unclear whether the "wherein the antisense polynucleotide..." language modifies only the method of the "introduction of any antisense" or something more.

Claim Rejections - 35 U.S.C. §101

35 U.S.C. §101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 17-18 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example Ex parte Dunki, 153 USPQ 678 (Bd.App. 1967) and Clinical Products, Ltd. v. Brenner, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). MPEP 2173.05(q). Claims 17-18 are also rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well-established utility.

Claims 17-18 are directed to a method of inducing plant growth inhibition by suppressing the expression or function of SEQ ID NO: 2. However, the claimed method disclosed in the specification does not have a substantial or a well-established utility.

The broadest reasonable interpretation of the claims includes a method which cripples plants' ability to biosynthesize biotin by transgenic expression of the sense or antisense strand of a sequence at least 70% identical to SEQ ID NO: 2. Furthermore, since the claims are directed to a method, the utility analysis is limited to the recited method. There is no substantial utility for Claims 17-18. Applicant recites a method that results in the creation of biotin auxotrophic mutant plants. Utilities that require or constitute carrying out further research to identify or reasonably confirm a "real world" context of use are not substantial utilities. A research method of investigating the physiological characteristics of the AtKAPAS protein does not have a substantial utility. A research method of creating a plant material that itself has no specific and substantial utility does not have a substantial utility. Simply put, to satisfy the substantial utility requirement, an asserted use must show that the claimed invention has a significant and presently available benefit to the public.

The basic research applicants undertook to characterize a potential herbicide target via transgenic expression of the sense or antisense strand of a sequence at least 70% identical to SEQ ID NO: 2, especially to characterize the function of the enzyme, does not constitute a specific and substantial utility of the elected method. Identifying or studying the properties of the biotin synthase protein itself or screening for compounds which inhibit the protein do not define a specific and substantial asserted utility of the elected method. While the addition of Vitamin B to growth media on a greenhouse scale may be practical for research purposes, on a field scale,

the addition of Vitamin B to a field crop would be exorbitantly expensive. Moreover, crippling a plant's ability to make Vitamin B would almost certainly affect yield. In the real world, farmers would not voluntarily practice a method to decrease the yield of their crops without some countervailing benefit.

An asserted utility of investigating the physiological characteristics of the AtKAPAS protein by introducing the AtKAPAS gene in the sense or antisense orientation resulting in the inhibition of the expression of AtKAPAS transcript is not a substantial use of the elected method. (para. 71-73; Specification, Examples 3 and 4, pp. 18-19). A substantial use is one that provides an immediate, real world benefit to the public. Further experimentation is necessary to attribute a utility to the claimed method.

An asserted utility of inducing plant growth inhibition by introducing the AtKAPAS gene in the sense or antisense orientation resulting in the inhibition of the expression of AtKAPAS transcript is not a substantial use of the elected method. (para. 71-73; Examples 3, 4).

The claimed method of inducing plant growth inhibition by suppressing expression or function of SEQ ID NO: 2 by antisensing is not supported by a specific and substantial asserted utility because the disclosed use of the method has no "real world" context. There is no disclosed or real world utility associated with the claimed method. Further experimentation is necessary to attribute a utility to the claimed method.

An asserted utility of screening for a biotin biosynthesis polypeptide to screen for candidates for developing novel herbicides is not a substantial use of the elected method. (para. 71-73; Examples 3, 4). A substantial use provides immediate benefit to the public. Further experimentation is necessary.

Note, because the claimed invention is not supported by a specific and substantial utility for the reasons set forth above, credibility has not been assessed. Neither the specification as filed nor any art of record discloses or suggests any use for the methods such that another non-asserted utility would be well established.

There is no disclosed or real world utility associated with the claimed method. Further experimentation is necessary to attribute a utility to the claimed method. See *Brenner v. Manson*, 383 U.S. 519, 535-36, 148 USPQ 689, 696 (1966) (noting that "Congress intended that no patent be granted on a chemical compound whose sole "utility" consists of its potential role as an object of use-testing", and stated, in context of the utility requirement, that "a patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion.").

Thus, for the reasons set forth herein, the claimed method lacks utility. (See Utility Examination Guidelines Published in Federal Register / Vol. 66, No. 4/Friday, January 5, 2001/Notices; p. 1092-1099).

Claim Rejections - 35 USC § 112, 1st, paragraph, written description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 17-18 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a substantial or a well-established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claims 17-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants' claims recite, *inter alia*, all amino acid sequences having at least 70% identity to SEQ ID NO: 2.

Applicants describe SEQ ID NO: 2.

Applicants do not describe a representative number of amino acid sequences having at least 70% identity to SEQ ID NO: 2.

There is no clear depiction or actual reduction to practice of all amino acid sequences having at least 70% identity to SEQ ID NO: 2.

Applicants fail to describe a representative number of all amino acid sequences having at least 70% identity to SEQ ID NO: 2. Applicants have only described SEQ ID NO: 2.

SEQ ID NO: 2 is not a representative sample of all amino acid sequences having at least 70% identity to SEQ ID NO: 2.

Applicants fail to describe structural features common to members of the claimed genus of all amino acid sequences having at least 70% identity to SEQ ID NO: 2. Applicants do provide an alignment in Figure 1 but do not recite which structural features are common to members of the claimed genus of all amino acid sequences having at least 70% identity to SEQ ID NO: 2. Applicants do not describe which regions are required for function. Furthermore, given the lack of description of the necessary elements essential for all amino acid sequences

having at least 70% identity to SEQ ID NO: 2 that have the asserted function, it remains unclear what features identify all amino acid sequences having at least 70% identity to SEQ ID NO: 2 that still have the asserted function. Since the genus of all amino acid sequences having at least 70% identity to SEQ ID NO: 2 has not been described by specific structural features, the specification fails to provide an adequate written description to support the breadth of the claims.

Given the claim breadth and lack of guidance as discussed above, the specification fails to provide an adequate written description of the claimed method. Accordingly, one skilled in the art would not have recognized Applicant to be in possession of the claimed invention at the time of filing.

7. Claims 17-18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for SEQ ID NO: 2, does not reasonably provide enablement for all amino acid sequences having at least 70% identity to SEQ ID NO: 2.

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The *Wands* court set forth the enablement balancing test:

> Factors to be considered in determining whether a disclosure meets the enablement requirement of 35 USC 112, first paragraph, have been described by the court in *In re Wands*, 858 F.2d 731, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). *Wands* states at page 1404, "Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the board in Ex parte Forman. They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims."

M.P.E.P. § 2164.01(a).

Applicants teach SEQ ID NO: 2.

Applicants do not teach a representative number of amino acid sequences having at least 70% identity to SEQ ID NO: 2.

Neither Applicant's disclosure nor the state of the prior art provides guidance as to which portions of amino acid sequences having at least 70% identity to SEQ ID NO: 2 are required to retain function.

Given a sequence 100% identical to the sequence of interest, in this case SEQ ID NO: 2, claims 17-18 would be enabled.

One example of the lack of enablement of all sequences 70% identical to SEQ ID NO: 2 is seen when the method is antisense. Antisense is well known to work well only when the upstream region of the sequence has perfect or nearly perfect homology. If Applicants' sequence had 0% homology for the first 30 nucleotides, but 75% homology for the remaining sequence and 70% identical to SEQ ID NO: 2 overall, it is unlikely that 70% identical to SEQ ID NO: 2 would work.

Colliver, et al., teach (COLLIVER, et al., Differential modification of flavonoid and isoflavonoid biosynthesis with an antisense chalcone synthase construct in transgenic *Lotus corniculatus*, Plant Molecular Biology, Volume 35, Issue 4, Nov 1997, Pages 509 – 522) that antisense is unpredictable. Colliver sought to decrease condensed tannins in plants by down-regulating expression of Chalcone Synthase (CHS) via antisense expression of the CHS gene sequence. Colliver predicted that by antisensing CHS, CHS transcripts levels and condensed tannin levels would decrease. "The results suggest that . . . anti-sens[ing] CHS…leads to an increase in . . . CHS transcript. The . . . CHS transcript . . . was greater in antisense lines . . . than

the strongest detectable signal from . . . control lines . . ." (*Id.* @ page 515, paragraph bridging both columns). "The mean levels of condensed tannin found in . . . antisense transformed lines . . . was (*sic*, were) higher than . . . control lines . . . ." The data indicated that there were *no* examples of decreased condensed tannin accumulation in antisense lines relative to controls. "*Such an observation is in contrast to a predicted antisense-mediated decrease in . . . tannins . . .* ." (Colliver @ page 515, paragraph bridging both columns, emphasis added).

Rohr et al., teach that RNAi, in a number of eukaryotes, is *unpredictable*, that the level of silencing triggered by dsRNA-producing transgenes is "*quite variable*" depending on the type of construct, transgene copy number, site of integration, and target gene (references omitted), and that the use of inhibitory RNA (IR) constructs containing introns appears to improve their effectiveness (references omitted) but independent transgenic lines still show variable phenotypes and degrees of target mRNA decrease (references omitted) (emphasis added). Rohr continues that in *Arabidopsis thaliana* reduction in transcript levels induced by IR transgenes appears to *differ significantly among target genes* (references omitted). Thus, individual lines *need to be molecularly characterized by burdensome trial and error experimentation* for suppression of a certain gene before potential phenotypic defects can be evaluated (emphasis added). (Rohr et al. 2004, Plant J. 40:611-621.).

Accordingly, one skilled in the art cannot make and use amino acid sequences having at least 70% identity to SEQ ID NO: 2.

Claim Rejections - 35 U.S.C. §103, lack of unobviousness

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

35 U.S.C. §103(a).

The *Graham* court set forth the factual inquiries that are applied for determining obviousness under 35 U.S.C. 103(a):

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966).

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishige (6337430-US, issued 1/8/02) in view of Bevan et al(UniProt_8.4 Database, Accession No. Q9LZ63, Direct submission, 4/20/2000) and further in light of Allen (2001/0039042-US published 8 November 2001). The claims are broadly drawn to cosuppression or alternatively

antisense expression of Arabidopsis thaliana KAPA synthase (8-amino-7-oxononanoate synthase also known as 7-keo-8-aminoperlagonic acid synthase or bioF in E. coli) in transgenic plants.

Ishige teaches a method for inducing plant growth inhibition by suppressing the expression or function of a polypeptide with a function identical to SEQ ID NO: 2; and further wherein the suppression of the expression of the polypeptide is achieved by introduction of a sense or antisense polynucleotide, wherein the antisense polynucleotide is complementary to an isolated polynucleotide encoding the polypeptide. (Column 17, lines 5-12).

Ishige DOES NOT teach an amino acid sequence at least 70-100% identical to SEQ ID NO: 2. Bevan teaches a sequence which is 100% identical to SEQ ID NO: 2.(*Arabidopsis thaliana* KAPA synthase (At-KAPA synthase)).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to substitute the At-KAPA synthase of Bevan (SEQ ID NO: 2) for the *E. coli* KAPA synthase of Ishige for the purposes of expressing or antisensing At-KAPA synthase in plants as taught by Ishige. One skilled in the art would have been motivated to generate the claimed invention because Allen teaches that biotin biosynthetic genes are targets for herbicide development research; Allen also teaches that plant based production of biotin biosynthetic enzymes via sense expression of said enzymes can be used to provide enzymes for research testing of herbicide compounds. (para. 4-5; claim23) One would have done so with a reasonable expectation of success because Ishige's KAPA synthase and Bevan's KAPA synthase catalyze the exact same reaction. Accordingly, one of ordinary skill in the art would have generated the claimed invention.

9. All Claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brendan O. Baggot whose telephone number is 571/272-5265. The examiner can normally be reached on Tuesday through Thursday, 10:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on 571/272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call **800-786-9199** (IN USA OR CANADA) or **571-272-1000**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is **571-272-1600**.

/Anne Marie Grunberg/
Supervisory Patent Examiner, Art Unit 1661